

ACKNOWLEDGING OUR ANTHROPOMORPHISM

Why We Should Not Fear Animal Mental States in Science

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Abstract

Anthropomorphism is defined as the tendency to assign human traits to nonhuman entities. Within science, this is often narrowed down to mean the tendency to ascribe human emotions and inner states to nonhuman animals. Ever since ancient Greece, scientists have looked at this phenomenon as something we should avoid at all costs. It was not until the recent few decades that a different opinion on this matter was heard. Focusing too much on avoiding anthropomorphism can lead to a number of problems of its own. One can miss vital parts of the nonhuman animal's behaviour or can even lead scientists to subconsciously anthropomorphize without acknowledgment. With comparative cognition and psychology becoming more and more popular, this negative view on anthropomorphism becomes a restraint to research. Anthropomorphism in itself is very heavily dependent on an anthropocentric view. To change our ideas on how to perform research, and to allow for more growth within these scientific fields, we must change this anthropocentric view on inner states of nonhuman animals. To answer questions about cognition throughout the animal kingdom, we need to focus on the mental continuity of species instead. Critical anthropomorphism could be the key to do this. To change our view on the inner states of animals, we need a drastic change in mentality. Lyon has offered such a change, which she calls the biogenic approach. Although this might not be the only solution to our current problem, it is important to start thinking about one.

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Introduction

The field of ethology and pharmacology both have had decades to develop, and there exists a large number of standardized behavioral tests. These are especially useful when doing research in an animal model (such as rats, mice, or fruit flies). Often, the tests are focused on measuring the effectiveness of a type of drug. They are usually part of a bigger mission to find better medicine options for human diseases. One of these tests – specifically developed to use in rats – is the forced swim test.

The forced swim test was originally developed to study the effect of antidepressants in a rat model for depression. For this test, a rat is put into a cylinder filled with water. Although rats can be great swimmers, they prefer to be on dry land. Thus, once a rat is placed in this cylinder it will start swimming around to try and find an exit. Once it realizes there is none, it can do one of two things: it can keep swimming (active coping mechanism), or it can start floating (passive coping mechanism). If the rats often choose for the passive coping mechanism when treated with antidepressants, then it is seen as proof that the antidepressants are working correctly (Porsolt et al., 1977).

However, because of the context of this test, it is often misinterpreted. Many scientists wrongly use this test to “diagnose” depression in a rat model. If the rat starts floating after swimming around for a bit, it is very tempting to interpret this as ‘giving up’, as it looks as if the rat simply stopped trying. More likely, this passive coping mechanism has to do with energy preservation. The fact that this test is so often wrongly used to diagnose depression is a prime example of the problem of *anthropomorphism* within a scientific context. Anthropomorphism is defined as the tendency to ascribe human-like traits to non-human entities such as other animals. Yet, new problems arise when one tries to constantly avoid anthropomorphism. Vital parts of nonhuman animal behavior can be missed, or even simply ignored.

The term anthropomorphism derives from the Greek *anthrōpos* (ἄνθρωπος, meaning ‘human’) and *morphē* (μορφή, meaning form). It was originally used to describe when people would (wrongly) describe the Gods as humanlike. One of the first times the term was used when talking about nonhuman animals specifically was in 1860 (Lewes, 1860).

“We speak with large latitude of anthropomorphism when we speak of the ‘vision’ of these animals.... Molluscan vision is not human vision: nor in the accurate language is it vision at all...” (Lewes, 1860, p. 359)

Here Lewes points out a problem with “anthropomorphizing” nonhuman animals that is still present today. Lewes criticizes the general language when talking about nonhuman animals, as it is impossible for us to know the inner state of other species – let alone to know whether there even *exists* such a mental state. In this quote, he uses the idea of ‘vision’ as an example. He points out that we cannot assume that the way we experience vision is similar to that of other animals (in this case, mollusca, a type of deep-sea invertebrate).

The example of the forced swim test shows why anthropomorphism can be a dangerous practice in science. Morgan, one of the founders of comparative psychology, was especially afraid of this anthropomorphic bias. He proposed what is now famously known as Morgan’s Canon:

“In no case may we interpret an action as the outcome of the exercise of higher psychological processes, if it can be fairly interpreted in terms of processes which stand lower in the scale of psychological evolution and development.” (Morgan, 1894).

This has led to an increase in critical thinking when it comes to investigating cognition in other animals. However, this Canon is also vulnerable to misinterpretations. Focusing too much on how to avoid anthropomorphizing in science can lead to “methodological and evaluative anthropocentrism” (Buckner, 2013). Buckner defines this as the tendency to test nonhuman animals using human tasks. This leads to a lack of recognition of the animals themselves. We only show interest in nonhuman animal behavior in the ways it resembles our own (Barrett, 2015). Because of this, we risk missing vital parts of other animals by avoiding to describe any and all mental states.

In this essay, I will explain why I believe our view on anthropomorphism within science needs to change. First, I will give an overview of the historical views on anthropomorphism in science. After this, I will focus on the current view on the matter and argue why and how this should change. I will do this both on a scientific and a moral level.

History

Anthropomorphizing animals was seen as wrong, and still is seen as wrong today. However, over time there has been a shift in the reasoning of *why* it is wrong. Up until the late 1800s, it was believed that other animals were ‘things’, as opposed to humans. For example, Descartes described nonhuman animals as “mechanistic automatons” (Allen & Trestman, 2016). We, as humans, were thought to be the only beings to have a soul. Thus, it was wrong to assume other animals could have an ‘inner mental state’ the way we experience this.

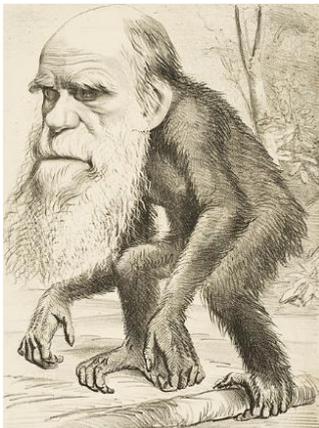


Fig. 1 A cartoon posted in *The Hornet* in 1871, showing Charles Darwin portrayed as an ape.

One of the first scientists to try and change this view of nonhuman animals was Charles Darwin. When he published his book *The expression of Emotions in Man and Animals* in 1872, he publicly questioned this belief. He was convinced that all living things were related for which he coined the word “interrelatedness”. The theory of evolution implies that we are derived from primates – in fact, the human race should be classified as a primate as well. If his theory would be correct, it was no big leap for Darwin and his followers to think a mental continuity must exist between animals as well – including humans (Darwin, 1872). Although his beliefs led to him being ridiculed by the public (a famous cartoon posted in *The Hornet* shows Darwin as an ape himself, see fig. 1), it was an important point to make at this time.

It was his student, Romanes, who followed in his footsteps and tried to convince the public that mild anthropomorphizing should be allowed. In 1883, he published his book *Animal Intelligence*. He argued that nonhuman animals show “external indications of mental processes”, which are clearly observable (Romanes, 1883, p. 8-9). According to Romanes, this meant that it is justified “[to infer] particular mental states from particular bodily actions”

(Romanes, 1883, p. 8-9). Romanes was a supporter of Darwin's theory of evolution, and put down the foundation for the field of comparative psychology to back this up.

Despite both Darwin's and Romanes' belief that anthropomorphism was not inherently wrong, they did not sway the general belief within science or the public. In the early 1900s a new philosophical theory arose. The emphasis was on objective observation, where everything should be derivable from one's behavior. The theory was therefore called behaviorism, and it left no place for internal or mental states (Hocutt, 2006). Behaviorism focuses on the individual specifically, and views psychology as a science of behavior, not so much of the mind (Graham, 2015). Followers of this theory believe that behavior can always be described or explained without any reference to a mental or inner state. This clearly shows their view on anthropomorphism already – it was seen as something that should be avoided at all costs. Behaviorism bled through into the psychological sciences as well. Any mental terms or concepts that were used should either be replaced or translated by behavioral concepts. Skinner is perhaps one of the most well-known names within the theory of behaviorism. He called his own view 'radical behaviorism', which was based on operant conditioning. This means that in his view, a behavior would always be followed by a consequence. This consequence is what in turn modifies the likelihood of an individual repeating the behavior again in the future (Skinner, 1948).

Although similar to the view on anthropomorphism in the past, this marks an important shift in the reasoning on *why* anthropomorphism should be avoided. Before, anthropomorphism was seen as wrong because nonhuman animals were simply believed not to have any kind of inner or mental state. According to the theory of philosophical behaviorism, however, this is not true. Instead, anthropomorphism should be avoided because we cannot *prove* nonhuman animals experience a mental state. This is fundamentally different, as this belief allows for the possibility of other animals having an inner state. It is just not something that is or can be studied, and therefore is believed to have no place in science.

Philosophical behaviorism was a wildly popular theory, and became the mainstream view in psychology and biology. Many scientists concerning themselves with psychology or behavior did not just avoid mentioning inner states, but sometimes even actively avoided and discouraged talking about the brain (Hocutt, 2006).

Around the time philosophical behaviorism was ending its peak in popularity, a new and separate field of science arose: ethology. This field on studying behavior gained more followers after the work of Lorenz and Tinbergen, two ethologists thought to have laid the foundation of the study of behavior. Although this field put nonhuman animals more into focus, it still shared the behavioristic view on anthropomorphism. Mentioning any type of inner state or "feeling" in nonhuman animals should be avoided. It was simply thought of as 'bad science'.

Since then, there have been a number of scientists trying to argue we can and *should* investigate the mental states of all animals. It has perhaps changed the view on anthropomorphism into a slightly milder one, but overall the term still carries a negative meaning.

In short, the view on nonhuman animals has changed enough for people to often allow the notion that these animals might experience mental states similar to us humans. However, it is still thought that describing these states should be avoided within scientific circles.

Why we anthropomorphize

Reading all about the negative opinions on anthropomorphism in science leads us to another important question. If generally scientists see this as something that should be avoided, why do we anthropomorphize in the first place? Why is it so natural for us to ascribe human traits to other entities?

Although scientists have been discussing the fact of anthropomorphism within science for centuries, it was not until recently that scientists started to look at anthropomorphism as a possible human behavior trait to study. Guthrie reported in 1997 that no real systemic analysis had been done on anthropomorphism as a behavior. In fact, it was not until the early 2000s that scientists started to pay more attention to this behavior, in an attempt to answer the question of *why* we do what we do.

Epley et al. (2007, 2008) have proposed a theory on why we anthropomorphize. It is already known that humans are social creatures (Diener & Seligman, 2002). We often experience a need for social connection (Baumeister & Leary, 1995), as well as a need to understand and sometimes even control our environment (White, 1959). Especially this last factor leads to a very universally human phenomenon. When presented with an unknown stimulus, we base our expectations on the representation of a better-known stimulus (Rips, 1975). According to Epley et al. (2008), anthropomorphism is just one of the situations in which we reason in this way. In other words, Epley et al. (2008) offered two possible answers to the question of why we anthropomorphize. After forming this theory, Epley et al. (2007, 2008) put it to the test by performing an experiment on human subjects.

The first explanation they studied is that anthropomorphism might fill our need for social contact. In their study, Epley et al. found that lonely people were more likely to anthropomorphize their pets compared to people with many social contacts. This finding supports their theory that anthropomorphism is based on a need for social contact. A second possible answer is our natural need for control of the environment. More control of our surroundings means we can better understand and predict them. Anthropomorphizing nonhuman entities such as other animals provide us with a clear guide to behavior. Ascribing human traits to these entities will make it easier for us to understand and predict. This idea was first presented by Donald Hebb, an ethologist working with primates. Although he tried to remain as objective as possible, he noticed that the animal keepers' anthropomorphism helped them understand and predict the behavior of their subjects better (Hebb, 1946). Epley et al. suggest that this is the case for many other contexts and animals.

Within science, we all strive to be as objective as possible. However, in our focus on being fully objective, it is easy to lose sight of one very important factor. No matter how hard we try, we will always look at the world from a fully anthropocentric type of view. We can try and put ourselves in the shoes of others, but we can never fully know what it is like to be another animal. Because of this, the risk of "too much" anthropomorphizing is always present when interpreting animal behavior. This is not something we can fully change, but it *is* something we can stay aware of.

Why We Should Change Our Current View

In the previous section, I have laid out a summary of the history of science as well as the view on anthropomorphizing animals. Although changes have occurred, the term is seen as something negative even now. There are still scientists arguing about why anthropomorphism should be avoided. In 2007, Wynne published a paper on why anthropomorphism has no place in science. Recognizing that there *are* benefits to reintroducing anthropomorphism into science, he argues that there are still too many drawbacks to actually do so. In his words, “the reintroduction of anthropomorphism risks bringing back the dirty bathwater as we rescue the baby” (Wynne, 2004). To Wynne and many other scientists, anthropomorphism leads to folk-psychological views on nonhuman animals, and does not have a useful role in science. The debate on whether anthropomorphism has a place in science is a difficult one, and there are both scientific and moral arguments for why the current view should change. In this section, I will pry the two apart and discuss both of these types of arguments.

Scientific arguments against avoiding anthropomorphism

As mentioned before, Wynne acknowledges in his paper that there are some that argue for a less negative view on anthropomorphism. Often, this is done through separating different “types” of anthropomorphism. For example, Rivas and Burghardt (2002) make a distinction between “naïve anthropomorphism”, something we should avoid, and “critical anthropomorphism”. Naïve anthropomorphism is the kind we experience in our daily lives, where we assume emotions and the like in other animals without any critical thinking involved.

Burghardt proposed the idea of “critical anthropomorphism” in 1985 (Burghardt, 1985). This type of anthropomorphism involves careful and replicable observation, which distinguishes it from the kind of naïve anthropomorphism Rivas and Burghardt describe. The difference with regular behavioral studies is that Burghardt suggests we use our knowledge of the natural history, ecology, and sensory and neural systems of the animals as well (Burghardt, 2004). In a way, it is similar to a theory proposed by Timberlake (Burghardt, 2006; Kitchener & O’Donohue, 1999). This theory, “theromorphism”, proposes animal-centric observation, where we put ourselves into the position of the animal under study, instead of studying the subject from a human point of view. This critical version of anthropomorphism will help scientists to avoid mistakes, without missing vital parts of the animal’s behavior.

Lastly, Burghardt and Rivas (2002) describe anthropomorphism by omission, which is perhaps one of the main reasons why the current view within science should change. They explain that anthropomorphism by omission means we forget or take for granted the fact that nonhuman animals experience the world in a different way. This is often what happens when scientists believe they are avoiding all types of anthropomorphism. In their words,

“The most easily recognized are not the problem; the conceit that one is immune to them is more often the problem. . . . scientists are not immune; lurking unseen it can compromise efforts in many areas.” (Rivas & Berghardt, 2002, p. 15)

Although the discussion on anthropomorphism and its place within science has been debated heavily for decades, now of all times it is important to take a critical look at the way we do science. Although the attention towards anthropomorphism and its possible uses is

becoming more present within scientific circles (Horowitz & Bekoff, 2007; Barrett, 2015), there has not been a big change in the protocols of science. At the same time, however, we see a growing interest in topics such as comparative cognition and the neuroscience of nonhuman animals.

Research on cognition in animals has ranged from tool use and selection in primates (Lamon et al., 2018), to the learning abilities of bumblebees (Raine & Chittka, 2008), to cognitive function in the red-footed tortoise (Wilkinson et al., 2007).

This growing interest has led to another debate. Namely, what do we mean exactly when we talk about cognition, and can we talk about nonhuman animal cognition? The research on cognition in nonhuman animals seems to say yes. However, most of the interpretations of the results are still discarded. As Shettleworth (2010) points out, possibly clever animals often get ‘killjoy’ explanations. Instead of acknowledging the possibility of a higher form of cognition, scientists try to find any possible explanation that can discard this idea.

One example is the tool-use in the New Caledonian crow. This bird species is special, as it not only creates tools in its daily life, but also saves and repeatedly uses these tools (Wimpenny et al., 2009). The first few scientists to discover this believed it to be proof of a higher form of cognition in these corvids. However, not long after that, other scientists discredited this idea by using the beak shape and position of the eyes as a ‘simpler’ explanation. Unfortunately, this is not the only case of possible higher cognition in nonhuman animals being explained away. The current view on anthropomorphism in science almost *prevents* any other interpretation.

This disbalance between the rise in animal cognition research and the denial of nonhuman animals having any human-like characteristics is leading to a clash that needs to be solved. Because of the current views, we are so busy avoiding anthropomorphism that we forget to focus on similarities between species. The idea that some traits are strictly human leads us to discard part of the important findings in animal research as anthropomorphism.

Moral arguments against avoiding anthropomorphism

This risk of missing out on important parts of behavior is something many scientists point out. De Waal calls this tendency within science “anthropodenial” (De Waal, 1997). The author himself defines this as “a blindness to the human-like characteristics of other animals, or the animal-like characteristics of ourselves”. Especially the last part of this definition points out one of the main problems within our anthropocentric view. It is the idea that we as humans are somehow “other” or perhaps even superior to nonhuman animals. This is striking, as in our current day Darwin’s theory of evolution is accepted as the truth in most circles. From his theory follows that we are not that different compared to other animals – not even in our mental capacities (Darwin called this “mental continuity”).

The underlying reason for anthropomorphism is understandable. After all, what we observe is the most likely to be true and objective, and it makes sense to stick to this. However, we already know about our own mental states and cognition as humans. This shows again the *discontinuity* between how we treat humans versus other animals. We assume, because the individual experiences inner states, that our fellow humans experience the same. Yet, we cannot look into the minds of other humans just as much as we cannot look into the minds of nonhuman

animals. Still, we draw a line between assuming inner states in other humans – something that is allowed – and assuming inner states in other animals – something that should be avoided. This seemingly random measurement about when it is okay to assume an inner state and when it is not, only adds to the “otherness” we ascribe ourselves as humans.

How we should change our current view

As one can already derive from just the term itself, anthropomorphism relies on a very *anthropocentric* view of science. Anthropocentrism describes the fact that we look at things from a human perspective. However, the term is also interpreted as seeing the humans as the most important entity. Using this view within science means that we interpret the world *only* in relation to our own species and our own values and norms. When looking back at the history of science, this view has always been present.

The term anthropomorphism alone shows how deeply rooted this view is in our thinking. Ascribing *human*-like traits to nonhuman entities assumes an even bigger difference between “us and them”. We assume some traits are solely human and cannot be present in other animals.

With more and more articles describing results on (nonhuman) animal cognition and intelligence, there is less space for such an anthropocentric view. In order to move this research forward, it is important we stop thinking about what makes humans different from other species – to stop thinking about *human* traits. Instead, we should start looking at similarities between animals. This is the very base of comparative studies: if we discover how similarities came to be in each species, we will discover more about the traits in question.

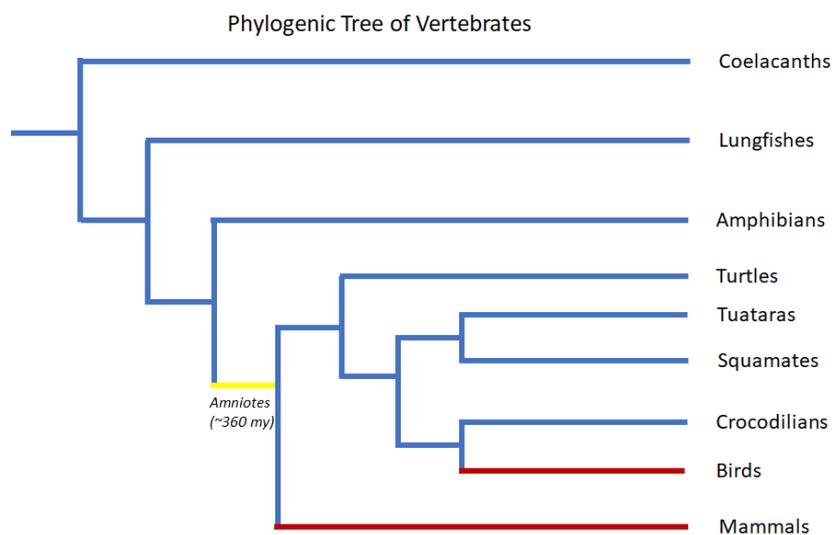


Fig. 2 A simplified phylogenetic tree of vertebrates. Birds and mammals are lined in red, with their last shared ancestor in yellow over 360 million years ago.

For example, corvids are a family of bird species that have been shown to have a perhaps surprisingly high cognition (Clayton et al., 2007; Emery & Clayton, 2004). Yet, a phylogenetic tree will show you that bird species have diverged from humans 360 million years ago (see *Amniotes* in Fig. 2). As a result, the brains of corvids and primates (including humans) are very

different. This type of convergent evolution of intelligence can teach us more about cognition – which criteria are necessary and which are not?

A focus on similarities instead of differences will thus allow for more growth in the research on comparative and nonhuman animal cognition. This focus on similarities I propose can be described as a bottom-up approach. All species have started from the same root of the phylogenetic tree. Looking at conserved or convergently developed traits can help us understand the world around us in a way we have not done so far.

In light of the dispute within the cognitive sciences, Lyon has offered a similar solution (2006), which she calls the biogenic approach. She specifically focuses on one of the main questions within this field: what is cognition and how does it work? According to Lyon, most scientists start from human cognition and work their way down the phylogenetic tree. This approach “assumes that human psychological attributes are the hallmarks of cognition and what sort of biological or evolutionary story might account for them” (Lyon, 2006, p. 12). In other words, this anthropocentric view assumes that human cognition is the “end point” of evolution. Instead, Lyon claims, we should use a biogenic approach: we have to start with the biological principles and work our way up. She describes a number of principles of this biogenic approach. Her first, and perhaps most relevant one for the purpose of this essay, is continuity.

“Complex cognitive capacities have evolved from simpler forms of cognition. There is a continuous line of meaningful descent” (Lyon, 2006, p. 15).

Darwin already emphasized the importance of continuity of species in 1872. We need to consider the theory of evolution when looking at animal behavior and cognition, something that is not always incorporated in current research. Focusing more on the evolutionary history of an animal species when studying its behavior will lead to a number of benefits. First, it will make it possible to fit the behavior into a bigger picture (namely, that of the evolutionary tree). Second, it puts a focus on the fact that humans are not always so different from other animals, and therefore will avoid both anthropomorphism and anthropocentrism. This comes close to what Burghardt coined as critical anthropomorphism (Burghardt, 1985), where he proposed we take the natural history and ecology into account when studying an animal. Yet, Lyon’s approach is unique in that she proposes to do away with the term anthropomorphism all together. Instead, we need to focus on a more bottom-up approach: one of the ways to achieve this can be Lyon’s proposed biogenic approach. It is important here to not mistake bottom-up as meaning “dumb to clever”. Instead, I mean to start our research at smaller cogs of the machine – biological traits or behaviors that are preserved or convergently developed in a number of species. From there, we can slowly work our way up to the complete, bigger picture of phenomena such as cognition.

Conclusion

Throughout history, the tendency to assign human-like traits to nonhuman animals has always been present. Anthropomorphizing nonhuman entities is in fact a very common, natural phenomenon in humans. Yet, it is often seen as something negative. For a long time, it was believed to be bad science to speculate or assume the inner state of nonhuman animals. This thought first came to be because men did not believe nonhuman animals *had* an inner state. Later, this slowly changed into avoiding anthropomorphism simply because we do not have an objective scientific method to measure inner states. Therefore, it is believed we should not speculate on such inner states. Although important, this change still did not change the negative meaning of the word anthropomorphism. During the last twenty years, however, the voice of opposition has slowly grown. Completely avoiding anthropomorphism leads to missing out on vital parts of animal behavior and cognition. It is important we do not look at nonhuman animals simply to discover in which ways they are similar to us. With the current view on anthropomorphism, however, this is still the status quo.

This is why the current scientific method needs to experience a (bigger) change. In order to not miss out on vital nonhuman animal behaviors, we should stop researching cognition in humans first before we make our way down. Instead, science needs to focus on a bottom-up approach. To follow Darwin's beliefs of mental continuity, and to be able to properly study cognition and behavior, we must do away with our anthropocentric view on cognition. Lyon proposed a different approach on science that might bring about the change I have suggested: the biogenic approach. I do not know if this could be the official solution to the problem I have stated in this essay. However, my meaning is to convince the reader that we do need a change, and not necessarily to provide a strict guideline on how to do so. Instead, I hope to have sparked the debate on anthropomorphism and anthropocentrism in science by offering a possible solution.

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